

ON THE COLLECTION OF BRYOZOA ALONG THE COAST
OF WAKAYAMA-KEN, THE MIDDLE
PART OF HONSYU, JAPAN

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ONE PLATE AND SEVEN TEXT-FIGURES

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The Bryozoan fauna of Wakayama-ken is very rich and includes both the tropical and subtropical elements due to the influence of the warm current running along the coasts.

We have had an opportunity to study the fine specimens obtained by Mr. M. Tanaka, a member of Mikimoto Pearl Culture Company, and Mr. I. Yamazi, of the Wakayama Normal School, as well as those belonging to the Seto Marine Biological Station collected by Mr. H. Hiro, a member of the station. Here we wish to express our hearty thanks to those gentlemen who gave us the opportunity. There are in all 233 specimens taken from various localities. The present report is the result of our study of these specimens and deals with 45 genera and 69 species, of which 5 species and one variety seem to be new to science.

SUB-CLASS ENTOPROCTA NITSCHKE 1869

Family Pedicellinidæ Johnston 1847

1. *Barentsia discreta* (Busk) 1886

Ascopodaria discreta Busk, 1886, Chall. Rep. p. 44, figs. 6-12.

Barentsia discreta Harmer, Siboga Exped., pp. 29-32, pl. 2, figs. 8, 9.

Distribution: Tristan da Cunha, Ceylon, India, China Sea, Magellanes, Chili, Florida, New Guinea, Makassar, Japan—Kanagawa-ken.

Locality: Several complete colonies were obtained at Kitahama.

SUB-CLASS ECTOPROCTA NITSCHKE 1869

ORDER 1 CTENOSTOMATA BUSK 1852

Family Vesiculariidae Johnston 1838

2. *Amathia distans* Busk 1886

Amathia distans Busk, 1886, Chall., Rep., p. 33, pl. 7, figs. 1-1c.—Harmer, 1915, Siboga Exped., pp. 68-70, pl. 5, figs. 6, 7.

Distribution: Java, Flores, Savu, Aru Is., Gulf of Mannar, Burma, Andamans, Red Sea, Japan.

Locality: Numerous complete colonies were obtained at Kada, Kitahama and Tonda.

ORDER 2 CYCLOSTOMATA BUSK 1852

Family Crisiidae Johnston 1838

3. *Crisia elongata* Milne-Edwards 1838

Crisia elongata Milne-Edwards, 1838, Ann. Sci. Nat. Zool., p. 203, pl. 7, fig. 2.—Harmer, 1915, Siboga Exped., pp. 96-102, pl. 8, figs. 1-8.

Distribution: Timor, Borneo, Celebes, Kei Is, Torres Straits, Ceylon, Queensland, Loyalty Is., Red Sea, Fiji, Algoa Bay, Naples, China Sea, Philippines, Australia, Japan.

Locality: Several fragments of a colony were obtained off Wakayama.

4. *Crisia eburneo-denticulata* Busk 1875

Crisia eburneo-denticulata Busk, 1875, Cat. Cycl. Poly. Brit. Mus., pp. 5-6, pl. 6.—Okada et Mawatari, 1935, Sc. Rep. T. B. D., sect. B, vol. 2, no. 35, pp. 144, 145.

Distribution: Spitsbergen, Barents Sea, Cape Mary, Japan—Kuriles, Aomori-ken, Sizuoka-ken.

Locality: Several fragments were obtained at Kusimoto, Kada and Tonda.

Family Entalophoridae Reuss 1860

5. *Entalophora proboscidea* (Milne-Edwards) 1838

Pustulopora proboscidea Milne-Edwards 1838, Ann. Sc. Nat., p. 219, pl. 12, fig. 2.

Entalophora proboscidea Harmer, 1919, Siboga Exped., pp. 108-110, pl. 10, fig. 12.

Distribution: Malay Arch., Mediterranean, Shetland, Adriatic, Canaries, Madeira, Heard Is., S. Indian Ocean, Naples, Amirante, Straits of Malacca.

Locality: A complete colony was obtained at a spot off Wakayama.

Family Tubuliporidae Johnston 1838

6. *Tubulipora pacifica* Robertson 1910

Tubulipora pacifica Robertson, 1910, Univ. Calif. Publ. Zool., vol. 6, p. 248, pl. 22, figs. 27, 28.

Distribution: California, Japan—Aomori-ken, Kanagawa-ken, Sizuoka-ken.

Locality: Some fragments were collected at Nakanosima and Tonda.

7. *Tubulipora pulchra* Mac Gillivray 1885

Tubulipora pulchra MacGillivray, 1885, Trans. Roy. Soc. Vict., p. 92, pls. 12-14.

— Okada, 1928, Sc. Rep. Tohoku Imp. Univ., Biol., vol. 3, no. 4, fasc. 1, p. 489, pl. 24, fig. 3, text-fig. 6.

Distribution: S. California, San Diego, Japan—Aomori-ken, Kanagawa-ken.

Locality: Numerous fragments and colonies were obtained at Kusimoto, Syakusizima, Tatigatani, and Tonda.

8. *Tubulipora atlantica* (Johnston) 1847

Idmonea atlantica Johnston, 1847, Hist. Brit. Zooph., p. 278, pl. 48, fig. 3.

Tubulipora atlantica Harmer, 1915, Siboga Exped., pp. 124-127, pl. 10, figs. 4, 5.

Distribution: Sumba, Borneo, Damar Is., Tiur Is., Aru Is., Torres Straits, Norway, Madeira, Shetland, Florida, Gulf of Mannar, Antarctic, Indian Ocean, Japan—Kanagawa-ken.

Locality: A few fragments of colony were obtained at Syakusizima and off Wakayama.

9. *Crisulipora iijimai* Okada 1917

Crisulipora iijimai Okada, 1917, Annot. Zool. Jap., vol. 9, pt. 3, pp. 343-345.

Distribution: Japan—Kanagawa-ken, Straits of Korea.

Locality: A complete colony was obtained at a spot off Wakayama.

Family Lichenoporidae Smitt 1866

10. *Lichenopora* (Savigny-Audouin) 1826

Melobesia radiata Savigny-Audouin, 1826, Jahresb. Schl. Gessel. f. Veter. Cultur, p. 235, pl. 6, fig. 3.

Lichenopora radiata Okada et Mawatari, 1935, Sc. Rep. T. B. D., sect. B, vol. 2, no. 35, p. 146.

Distribution: Sulu Arch., Philippines, Borneo, English Channel, Gulf of Gascony, Madeira, Naples, Adriatic, Majorca, Samoa, Australia, Red Sea, Japan—Tokyo-hu, Kanagawa-ken, Kagosima-ken, Sado.

Locality : Numerous complete colonies were obtained at Kanayama, Kusimoto, Nakanosima, Tonda and off Wakayama.

ORDER 3 CHEILOSTOMATA BUSK 1852

Family Aeteidae Smitt 1867

11. *Aetea truncata* (Landsborough) 1852

Anguinaria truncata Landsborough, 1852, Hist. Brit. Zooph., p. 288, pl. 16, fig. 57.

Aetea truncata Harmer, 1926, Siboga Exped., p. 196, pl. 13, figs. 5-7.

Distribution : China Sea, Denmark, Naples, Rapallo, Zanzibar, Cape Verde Is., Azores, California, Ceylon, Tortugas Is., Flores, Sumbawa, Mindanao, New Guinea, Banda Sea.

Locality : Several complete colonies were obtained at Tanabe Bay.

Note : The present specimen differs from the typical species described by Landsborough in 1852 in its more crenated form of the zoecium and in having the lateral buds usually on each side near the distal end of the attached portion.

Family Biflustridae Smitt 1872

12. *Acanthodesia serrata* (Hincks) 1882

Membranipora membranacea form *serrata* Hincks, 1882, Ann. Mag. Nat. Hist., vol. 10, p. 469.

Conopeum serrata Okada, 1929, Sc. Rep. Tohoku Imp. Univ., Biol., vol. 4, no. 1, fasc. 1, p. 11, text-fig. 1.

Distribution : California, Vancouver, Queen Charlotte Is., Panama, Japan.

Locality : Several complete colonies were collected at Kusimoto.

13. *Acanthodesia savartii* (Audouin) 1826

(Pl. 24, fig. 1)

Flustra savartii Audouin, 1826, Exp. Poly. Egypte, p. 240.

Acanthodesia savartii Harmer, 1926, Siboga Exp., pp. 213-216, pl. 13, figs. 8, 13, 14, 16.

Distribution : Egypt, Red Sea, Zanzibar, Indian Ocean, Tortugas Is., Java, Argentina, Queensland, Torres Straits Philippines, Morocco, Australia, Victoria, Celebes, Ceylon, Borneo, Aru Is., New Guinea, Sulu Arch., Malay Peninsula, Singapore.

Locality : Numerous colonies and fragments were obtained at Kada and Tanabe Bay.

Family Electrinidæ D'Orbigny 1851

14. *Nichtina tuberculata* (Bosc) 1802*Flustra tuberculata* Bosc, 1802, Hist. Nat. Vers., p. 118.*Nichtina tuberculata* Harmer, 1926, Siboga Exped., pp. 208-210, pl. 13, fig. 10.

Distribution: Indian Ocean, Madeira, Algoa Bay, Patagonia, California, N. E. India, Burma, Tortugas Is., Azores, Peru, Rio de Janeiro, Antilles, Sargasso Sea, Japan—Kanagawa-ken.

Locality: A complete colony was collected at Kitahama.

15. *Electra angulata* Levinsen 1909*Electra angulata* Levinsen 1909, Morph. Syst. Stud. Bry., pp. 149, 156, 160, pl. 22, fig. 4a.—Harmer, 1926, Siboga Exped., p. 207, pl. 13, fig. 11.

Distribution: Siam, Sumbawa.

Locality: Several small Fragments were obtained at Tatigatani and Tanabe Bay.

Family Flustridæ Smitt 1867

16. *Flustra papyracea* Ellis et Sollander 1786*Flustra papyracea* Ellis et Sollander, 1786, Nat. Hist. Zooph., p. 13.—Hincks, 1880, Hist. Brit. Mar. Poly., pp. 118-120, pl. 16, fig. 2.

Distribution: Roscoff, France, Japan—Sizuoka-ken, Koti-ken, Hukusima-ken.

Locality: Several large complete colonies were obtained at Kusimoto, Tonda and Tanabe Bay.

17. *Flustra stolonifera* Okada 1921*Flustra stolonifera* Okada, 1921, Annot. Zool. Jap., vol. 10, art. 3, pp. 19-21, text-fig. 1.

Distribution: Japan—Ibaragi-ken.

Locality: A small fragment of colony which may be identified the above species was collected at Tanabe Bay.

Family Alderinidæ Canu et Bassler 1917

18. *Tegella crenulata* (Okada) 1929

(Pl. 24, figs. 2, 3)

Ellisina crenulata Okada, 1929, Sc. Rep. Tohoku Imp. Univ., Biol., vol. 4, no. 1, fasc. 1, p. 2, pl. 4, fig. 1.

Distribution: Japan—Aomori-ken, Sizuoka-ken, Japan Sea.

Locality: Several complete colonies and fragments were collected at Kada and Wakayama.

Family Steganoporellidæ Hincks 1884

19. *Steganoporella magnilabris* (Busk) 1854

Membranipora magnilabris Busk, 1854, Cat. Mar. Poly. Brit. Mus., pp. 62, 113, pl. 65, fig. 4.

Steganoporella magnilabris Harmer, 1926, Siboga Exped., pp. 277-279, pl. 17, figs. 1-3, 7, 9, 12, text-fig. 10.

Distribution: Java, Borneo, Lombok, Sulu Arch., Celebes, Abrolhos Is., Florida, Bermuda, Queensland, Amirante Is., Honolulu, Sandwich Is., Algoa Bay, Pourtales, Brit. E. Africa, Zanzibar, Trincomali, Bay of Bengal, Gipps Land, Tongatabau, Port Dalrymple, Andaman, Ceylon, Burma, Japan—Kanagawa-ken, Tiba-ken, Wakayama-ken, Sizuoka-ken, Straits of Korea.

Locality: A large fragment was collected at a spot off Wakayama.

Family Thalamoporellidæ Levinsen 1902

20. *Thalamoporella rozieri* (Audouin) 1826

Flustra? rozieri Audouin, 1826, Exp. Poly. Egypte, p. 239.

Thalamoporella rozieri Okada et Mawatari, 1936, Sc. Rep. T. B. D., sect. B, vol. 2, no. 35, p. 131.

Distribution: Egypt, Cape Verde Is., England, Burma, Sulu Arch., Celebes, Banda Sea, Singapore, Jamaica, Queensland, Torres Straits, Japan—Tiba-ken, Ehime-ken, Mie-ken, Yamaguti-ken, Kagosima-ken, Formosa Channel.

Locality: Several complete colonies were obtained at Izumozaki, Kusimoto and Wakayama.

Family Cellariidæ Hincks 1880

21. *Cellaria triangularis* Ortmann 1889

Cellaria triangularis Ortmann, 1889, Arch. f. Naturg., 56, 1, p. 32, pl. 2, fig. 13.—Okada, 1921, Annot. Zool. Jap., vol. art. 3, pp. 30-32, text-fig. 7.

Distribution: Japan—Izusitito, Sizuoka-ken, Kanagawa-ken, Kyoto-hu, Kagosima-ken, Hokkaido, Straits of Korea.

Locality: Several complete colonies were collected at Kada, Tanabe Bay and Wakayama.

Family Bugulidæ Gray 1843

22. *Bugula dentata* (Lamouroux) 1816

Acamarchis dentata Lamouroux, 1816, Hist. Poly. Cor., p. 135, pl. 3, fig. 3.

Bugula dentata Harmer, 1926, Siboga Exped., pp. 439-441, pl. 30, figs. 5, 6, pl. 32, figs. 21-25.

Distribution: Australasia, Cape Colony, Flores, Sumba, Ceram, Celebes, New Guinea, Torres Straits, Singapore, Port Elizabeth, S. Africa, Victoria, Cape Verde Is., Amboina, Madeira, Amirante Is., Japan—Sizuoka-ken, Kanagawa-ken, Wakayama-ken, Okayama-ken, Izusitito.

Locality: Several colonies were collected at Kusimoto, Syakusizima and Tanabe Bay.

23. *Bugula vectifera* Harmer 1926

Bugula vectifera Harmer, 1926, Siboga Exped., p. 442, pl. 31, figs. 1-6.

Distribution: Madura Straits, Straits of Makassar, Japan—Sizuoka-ken.

Locality: Two complete colonies were obtained at Kada and off Wakayama.

24. *Bugula neritina* (Linnæus) 1758

Sertularia neritina Linnæus, 1758, Syst. Nat., ed. 10, p. 38.

Bugula neritina Okada, 1929, Sc. Rep. Tohoku Imp. Univ., Biol., vol. 4, no. 1, fasc. 1, p. 13, pl. 1, fig. 1.

Distribution: Cosmopolitan.

Locality: Numerous colonies and fragments were obtained at Tatigatani, Huzisima, Tanabe Bay, and off Wakayama.

25. *Bugula neritina* var. *minima* Waters 1909

Bugula neritina var. *minima* Waters, 1909, Journ. Linn. Soc., Zool., p. 136, p. 11, figs. 4-7.

Distribution: Tortugas Is., Red Sea, Indian Ocean, Malay, N. S. Wales.

Locality: Two small colonies attached to *Bugula neritina* (Linnæus) were obtained at Kada and Wakayama.

26. *Bugula californica* Robertson 1905

Bugula californica Robertson, 1905, Univ. Calif. Pub., Zool., p. 267, pl. 10, fig. 49, pl. 16, fig. 100.

Distribution: California, Lands End, San Francisco Bay, Pacific Grove.

Locality: A complete colony was collected at a spot off Wakayama.

27. *Bugula pugeti* var. *umbelliformis* Okada 1918

Bugula pugeti var. *umbelliformis* Okada, 1918, Annot. Zool. Jap., vol. 9, pt. 4, p. 424, pl. 6, fig. 8.

Distribution: Japan—Kanagawa-ken.

Locality: A complete colony was obtained at a spot off Wakayama.

28. *Caulibugula ciliata* (Robertson) 1905

Stirparia ciliata Robertson, 1905, Univ. Calif. Pub. Zool., vol. 2, p. 279, pl. 12, figs. 67-69, pl. 13, figs. 70-71.

Caulibugula ciliata Okada et Mawatari, 1935, Sc. Rep. T. B. D., sect. B. vol. 2, no. 35, p. 134.

Distribution: California, Japan—Wakayama-ken, Sizuoka-ken.

Locality: A colony was collected at Kusimoto.

Family Scrupocellariidae Levinsen 1909

29. *Scrupocellaria diadema* Busk 1852

Scrupocellaria diadema Busk, 1852, Cat. Mar. Poly. Brit. Mus., p. 24, pl. 28, figs. 1-3.
—Harmer, 1926, Siboga Exped., pp. 375-378, pl. 25, figs. 20-25.

Distribution: Madura Straits, Paternoster Is., Sumbawa, Flores, Timor, Celebes, Straits of Makassar, Sulu Arch., Mindanao, New Guinea, Banda Sea, Aru Is., Java, Torres Straits, Singapore, Malay Peninsula, Ceylon, Queensland, Madras, Arafura Sea, Burma, Austraria, Amboina, Ganjam Coast, Philippines, Society Is., Sumatra, Andamans, India, Japan—Tusima Channel, Sizuoka-ken, Kanagawa-ken.

Locality: Numerous colonies and fragments were obtained at Kada, Tonda, and Wakayama.

30. *Scrupocellaria macandrei* Busk 1852

Scrupocellaria macandrei Busk, 1852, Cat. Mar. Poly. Brit. Mus., p. 24, pl. 24, figs. 1-3.

Distribution: Cape Verde Is., Spain, Adriatic, Queensland, Zanzibar, Japan—Hukusima-ken, Kanagawa-ken, Yamaguti-ken, Nagasaki-ken.

Locality: Several colonies and fragments were obtained at Kada and off Wakayama.

31. *Scrupocellaria californica* Trask (1857)

Scrupocellaria californica Trask, 1857, p. 114, pl. 4, fig. 2.—Okada et Mawatari, 1935, Sc. Rep. T. B. D., sect. B, vol. 2, no. 35, p. 134.

Distribution: California, Japan—Sizuoka-ken.

Locality: Several fragments and colonies were obtained at Kata.

32. *Caberea lata* Busk 1852

Caberea lata Busk, 1852, Cat. Mar. Poly. Brit. Mus., p. 39, pl. 47.—Harmer, Siboga Exped., pp. 360-362, pl. 24, figs. 7-9.

Distribution: Sumbawa, Timor, Celebes, Straits of Makassar, New Guinea, Aru Is., Flores, Queensland, Torres Straits, Australia, New Zealand, China Sea, Loyalty Is., Amboina, Gaspar Straits, Madras, Japan—Kanagawa-ken, Sizuoka-ken, Straits of Korea.

Locality: Numerous colonies were obtained at Kada, Kusimoto, Tonda, Kitahama.

33. *Amastigia rudis* (Busk) 1852

Caberea rudis Busk, 1852, Nar. Voy. Rattlesnake, vol. 1, p. 377.—Harmer, 1926, Siboga Exped., pp. 349–350, pl. 23, figs. 9–13.

Distribution: Straits of Makassar, Mindanao, Kei Is., Timor, Queensland, Bass Straits, Victoria, Japan—Tusima, Okayama-ken, Mie-ken, Kanagawa-ken Ehime-ken, Tiba-ken, Sizuoka-ken.

Locality: A complete colony was collected at Kanayama.

34. *Menipea patelliformis* Busk 1884

Menipea patelliformis Busk, 1884, Chall. Rep., p. 22, pl. 5, fig. 4.

Distribution: Varparaíso.

Locality: Several complete colonies were obtained at Kada and Wakayama.

Family Beaniidæ Canu et Bassler 1927

35. *Beania mirabilis* Johnston 1840

Beania mirabilis Johnston, 1840, Ann. Nat. Hist., p. 272, text-figs. 1, 2—Harmer, 1926, Siboga exped., p. 419, pl. 28, fig. 15.

Distribution: Torres Straits, Sulu Arch., Britain, Burma, Victoria, Naples, Zanzibar, Azores, California, Ceylon, Spain, Florida.

Locality: A complete colony was collected at Tanabe Bay.

36. *Beania hexaceras* (Ortmann) 1889

(Pl. 24, fig. 12)

Diachoseris hexaceras Ortmann, 1889, Arch. f. Naturg., p. 26, pl. 1, fig. 30.

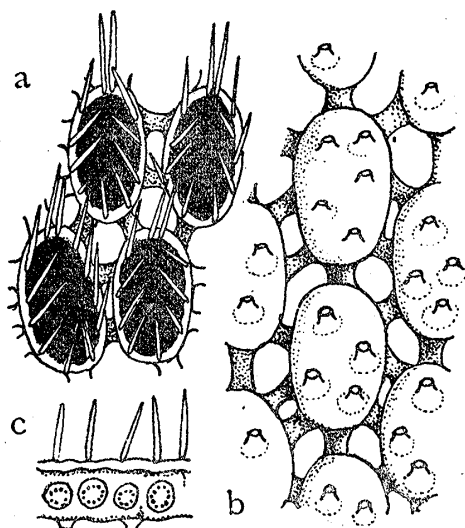
Distribution: Kanagawa-ken.

Locality: Two complete colonies were obtained at Kada and off Wakayama.

37. *Beania octaeeras* n. sp.

(Text-fig. 1)

Diagnosis: Zoarium reticulate, forming a large somewhat thick sheet of *Flustra*-like appearance; the fenestræ oval, very much smaller than the zoecia. Basal surface bearing 3–5 calcareous tubes on each zoecium with which the zoarium attaching to the substratum. Proximal part of zoecium very short; and the lateral connecting tubes, relatively broad. The expanded part constituting almost the whole zoecium, the opesia large, oval and elongated. A pair of distal spines

Text-fig. 1. *Beania octoceras* n. sp.

- a. Frontal view.
- b. Dorsal view.
- c. Septules.

at the middle of the distal end; the lateral spines slender, long, erect, 5-7 pairs in number. The lateral connecting tubes 3 on each side, and the lateral wall of the zoecium having 3 large multiporous septula.

Locality: A complete colony was obtained at Kada.

Note: The present species can be easily distinguished in the number of the lateral connecting tubes, apparently 6 in number. In frontal view, this species resembles *Beania vanhoeffei* Kluge but differs from it in the number of the connecting tubes and the calcareous basal tubes and in the situations and forms of the distal spines.

38. *Beania cupulariensis* Osburn 1914

Beania cupulariensis Osburn, 1914, Publ. Carnegie Inst. Washington, 182, p. 190, text-figs. 6, 7.—Harmer, 1926, Siboga Exped., p. 419, pl. 28, figs. 13, 14.

Distribution: Tortugas Is., Sulu Arch., Aru Is.

Locality: A complete colony was obtained at Tanabe Bay.

39. *Petralia japonica* (Busk) 1884

Lepralia japonica Busk, 1884, Chall. Rep., p. 143, pl. 18, fig. 5.

Petralia japonica Okada et Mawatari, 1936, Sc. Rep. T.B.D., sect. B, vol. 3, no. 49, p. 58, pl. 9, fig. 2.

Distribution: China Sea, Sibutu Is., Borneo, Indian Ocean, Mauritius, Trincomalee, Gulf of Manaar, Natal, Wasin, Brit. E. Africa, Red Sea, Bay of Agig Suraza, Japan—Kanagawa-ken, Sizuoka-ken, Ehime-ken, Kyoto-hu, Hyogo-ken, Simane-ken, Tiba-ken, Formosa Channel.

Locality: Numerous large fragments, dead or alive, were obtained at Kada, Kitahama and Wakayama.

40. *Petraliella armata* n. var. *mucroaviculata*

(Pl. 24, figs. 4, 5, text-fig. 2)

Diagnosis: Zoarium attaching to sponges by numerous radicles. The lateral walls have many multiporous septula arranged in one line; the shield-like area surrounding the aperture bears distally 5 spines and 2 avicularia laterally. The avicularian mucro is an enormous projection usually clearly bifurcated, having an ascendent avicularium

with lip-like mandible on one side; 2 or 4 small avicularia scattered over the frontal each on an elevated process with semi-circular mandibles. The radicles are longer or shorter, divided or flattened at the extremity.

Locality: The complete colonies were obtained at a spot off Wakayama.

Family Escharellidæ Levinsen
1909

41. *Dakaria typica* Okada
et Mawatari 1937

Dakaria typica Okada et Mawatari, 1937, Sc. Rep. Tohoku Imp. Univ., Biol., vol. 11, no. 4, p. 438, pl. 11, fig. 6, text-fig. 2.

Distribution: Miyagi-ken.

Locality: Several fragments of colony were obtained at Hosono, Tanabe Bay, and near Wakayama.

42. *Arthropoma cecilii* (Savigny-
Audouin) 1826

Flustra cecilii Savigny-Audouin, 1826, Exp. Poly. Egypte, 1, p. 239.

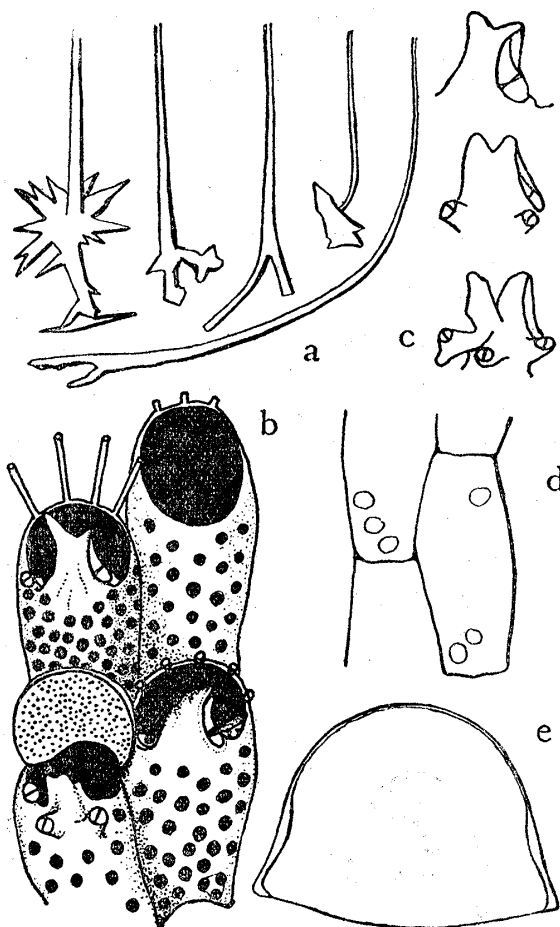
Arthropoma cecilii Canu et Bassler, 1929, Bull. 100, U.S.N.M., vol. 9, p. 296.

Distribution: W. Atlantic, British Channel, Gulf of Cadiz, Cape Verde Is., Mediterranean, Galapagos Is., La Jolla, California, Queen Charlotte Is., Australia, China Sea, Indian Ocean, Reunion Is., Zanzibar, Japan—Tiba-ken, Sizuoka-ken, Kanagawa-ken, Kagosima-ken, Tusima Channel.

Locality: A complete colony was obtained at Kusimoto.

43. *Schizomavella geleata* (Busk) 1854

Lepralia galeata Busk, 1854, Cat. Mar. Poly. Brit. Mus., p. 66, pl. 94, figs. 1, 2.



Text-fig. 2. *Petraliella armata* n. var.
mucro-aviculata

- a. Radicles.
- b. Zoecia and oecium.
- c. Oral mucro and avicularia.
- d. Dorsal view.
- e. Operculum.

Schizomavella galeata Okada, 1929, Sc. Rep. Tohoku Imp. Univ., Biol., vol. 4, no. 1, fasc. 1, p. 18, text-fig. 5.

Distribution: Falkland Is., Tierra del Fuego, Japan—Aomori-ken.

Locality: A large colony was obtained at a spot off Wakayama.

44. *Schizomavella auriculata* (Hassal) 1842

Lepralia auriculata Hassal, 1842, Ann. Mag. Nat. Hist., 7, p. 412.

Schizomavella auriculata Okada, 1929, Sc. Rep. Tohoku Imp. Univ., Biol., vol. 4, no. 1, fasc. 1, p. 18, text-fig. 5.

Distribution: Straits of Korea, Aomori-ken, Belfast Bay, Aegean Sea, Falkland Is., Norfolk, Sicily, California.

Locality: A large colony was obtained at Kusimoto.

45. *Schizopodrella nivea* (Busk) 1884

(Pl. 24, figs. 8–10)

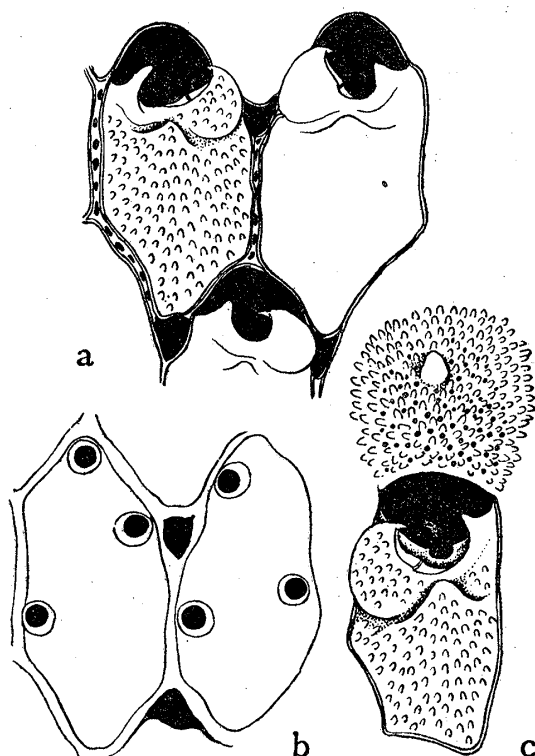
Schizoporella nivea Busk, 1884, Chall. Rep., p. 163, pl. 17, fig. 1.

Distribution: Cape of Good Hope.

Locality: A colony was collected at Kusimoto.

46. *Schizopodrella kiiensis* n. sp.

(Text-fig. 3)



Text-fig. 3. *Schizopodrella kiiensis* n. sp.

a. Zoecia.

b. Dorsal view.

c. Zoecium with oöcium.

Diagnosis: Zoarium incrusting sea-weeds, expanded, bilamellar. Zoecia distinct, hexagonal, arranged alternately in many linear series separated by distinct furrows and salient thread or band with a series of small pores, and on each corner a large triangular or sub-hexagonal foramen. Aperture sub-circular with a distinct median proximal rimule, more or less immersed in the collar-like peristome. The frontal granular or nodulous, convex, with a small but salient elevated process below the aperture. An oral avicularium situated laterally just before the aperture on a distinct process usually directing upwards with triangular recurved pointing mandible. The dorsal surface with 3–4 calcareous

adherent short tubes. Oöcia oblong, hyperstomial, granulated and minutely porous and infrequently with a small tubercle at the middle of the oöcium.

Locality: A complete colony was obtained at Izumozaki, Kusimoto.

47. *Lepralia obtusata* Ortmann 1889

Lepralia obtusata Ortmann, 1890, Arch. f. Naturg., p. 41, pl. 3, fig. 13.

Distribution: Japan—Kanagawa-ken.

Locality: A large fragment of colony was collected at a spot off Wakayama.

48. *Lepralia pertusa* (Esper) 1791

Cellepora pertusa Esper, 1791, Hist. Nat. Zooph., p. 149.

Lepralia pertusa Osburn, 1912, Bull. Bur. Fish., vol. 30, no. 760, p. 241, pl. 56, fig. 56.

Distribution: Cosmoporitan.

Locality: A colony was obtained at Kusimoto.

49. *Exochella areolata* Okada et Mawatari 1937

Exochella areolata Okada et Mawatari, 1937, Sc. Rep. Tohoku Imp. Univ., Biol., vol. 11, p. 440, pl. 11, figs. 3-5, text-fig. 3.

Distribution: Japan—Miyagi-ken.

Locality: Numerous complete colonies were collected at Kusimoto.

50. *Microporella ciliata* (Pallas) 1766

(Pl. 24, fig. 11, Text-fig. 4)

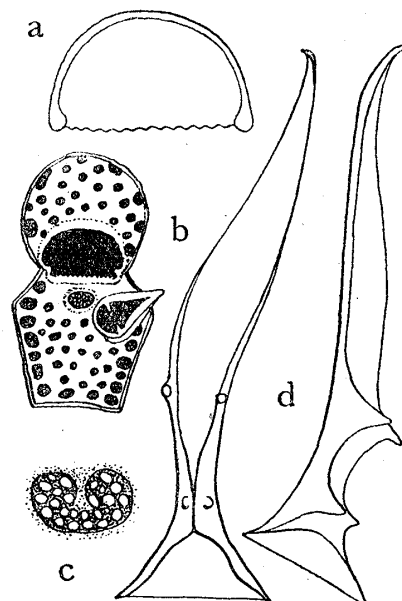
Eschara ciliata Pallas, 1766, Elench. Zooph., p. 38.

Microporella ciliata Okada et Mawatari, 1936, Sc. Rep. T.B.D., sect. B, vol. 3, no. 49, y. 63.

Distribution: Cosmopolitan, Japan—Kanagawa-ken, Tiba-ken, Sizuoka-ken, Yamaguti-ken, Nagasaki-ken, Kagosima-ken, Yamagata-ken, Hokkaido.

Locality: Several complete colonies was obtained at Kusimoto and near Wakayama.

Note: The present specimens are provided with an elongated avicularian mandible.



Text-fig. 4. *Microporella ciliata* (Pallas)

a. Operculum. b. Zoöcium.
c. Micropore. d. Mandibles.

51. *Microporella malusii* (Savigny-Audouin) 1811

Cellepora malusii Savigny-Audouin, 1811, Expl. pl., p. 239, pl. 28, fig. 8.

Microporella malusii Okada, 1929, Sc. Rep. Tohoku Imp. Univ., Biol., vol. 4, no. 1, fasc. 1, p. 27, text-fig. 12.

Distribution: Queen Charlotte Is., La Jolla, Catarina Is., Patagonia, Tierra del Fuego, New Zealand, Japan—Aomori-ken.

Locality: Several large colonies were collected at Kusimoto.

Family Smittinidae Levinsen 1909

52. *Smittina trispinosa* (Johnston) 1838

Discopora trispinosa Johnston, 1838, Ed. Phil. Zool., Journ., 13, p. 322.

Smittina trispinosa Okada, 1929, Sc. Rep. Tohoku Imp. Univ., Biol., vol. 4, no. 1, fasc. 1, p. 28, text-fig. 13.

Distribution: Queen Charlotte Is., Alasca, California, Norway, Nova Zembra, Kara Sea, Florida, Cape Horn, Adriatic, Japan—Aomori-ken.

Locality: A small colony was obtained at Kanayama.

53. *Smittina trispinosa* var. *nitida* (Verrill) 1875

Discopora nitida Verrill, 1875, Amer. Journ. Sc. Art., 3, vol. 9, p. 315.

Smittina trispinosa var. *nitida* Osburn, 1912, Bull. Bur. Fish., vol. 30, no. 760, p. 246, pl. 27, fig. 66, pl. 30, fig. 88.

Distribution: New Zealand, British Isles, Australia.

Locality: A complete colony was obtained at Kitahama.

54. *Smittina reticulata* (Mac Gillivray) 1842

Lepralia reticulata Mac Gillivray, 1842, Ann. Mag. Nat. Hist., 9, p. 467.

Smittina reticulata Okada, 1929, Sc. Rep. Tohoku Imp. Univ., Biol., vol. 4, no. 1, fasc. 1, p. 29, text-fig. 14.

Distribution: Cornwall, Norfolk, Northumberland, Shetland, Roscoff, Aegian Sea, Adriatic, Bergen, Norway, Falkland, New Zealand, Japan—Aomori-ken.

Locality: A small colony was obtained at Kusimoto.

55. *Smittina perforata* Okada 1923

Smittia perforata Okada, 1923, Annot. Zool. Jap., vol. 10, art. 22, p. 228, pl. fig. 26.

Distribution: Straits of Korea.

Locality: A complete colony was obtained at Kusimoto.

56. *Smittina foliaceana* n. sp.

(Pl. 24, fig. 6, 7, Text-fig. 5)

Diagnosis: Zoarium crustaceous or erect expanded, coarse looking.

bilamellar; grayish white in dried specimen. Zooecia arranged alternately in many linear series, distinct, separated by deep furrows, elliptical or sub-hexagonal; the frontal is a thickly calcified tremocyst, convex, elevated to a salient peristome distally and sometimes slightly concave proximally, perforated by rather large elliptical tremopores with somewhat fenestrate appearance. Zoöcial aperture circular; the peristome is salient, and its orifice is circular or elliptical, transverse, with a moderate rimule and a narrow lyrula proximally, and 1-2 traces of spines distally. The outermost zooecia of a colony have 4-5 hollow oral spines of moderate length distally. Two oral avicularia with pivot occur on the lateral sides of the peristome, directing obliquely upwards and usually the one is larger than the other, both with spatulate slightly curved mandibles. The larger avicularium sometimes develops enormously and pointing laterally or obliquely downwards, then the other one becomes very small or frequently disappears. Oöcium hyperstomial, almost fully imbedded in the distal zooecium, only recognizable with its slight convexity and radiating large areolar pores.

Locality: Several large colonies and fragments were obtained at Kada, Seto, Tatigatani, Tanabe Bay and off Wakayama.

57. *Muconella perforata* Okada et Mawatari 1937

Mucronella perforata Okada et Mawatari, 1937, Sc. Rep. Tohoku Imp. Univ., Biol., vol. 11, no. 4, p. 442, pl. 11, fig. 8, text-fig. 4.

Distribution: Miyagi-ken.

Locality: A large fragment was obtained at a spot off Wakayama.

Family Tubucellariidæ Busk 1884

58. *Tubucellaria cereoides* Ellis et Solander 1786

Tubucellaria cereoides Ellis et Solander, 1786, Nat. Hist. Zooph., p. 26, pl. 5, figs. B-E.
—Okada et Mawatari, 1936, Sc. Rep. T.B.D., sect., B, vol. 3, no. 49, p. 71.

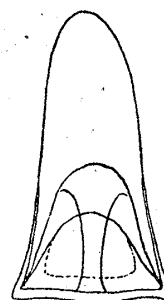
Distribution: Nice, St. Florent, Naples, Adriatic, Aegian Sea, Red Sea, Gulf of Manaar, Port Elizabeth, Andaman, China Sea, Loyalty Is., Torres Straits, Queensland, N. E. Wales, Victoria, Japan—Sizuoka-ken.

Locality: Several complete colonies were collected at Kada.

Family Reteporidæ Smitt 1867

59. *Reteporellina denticulata* (Busk) 1884

Retepora denticulata Busk, 1884, Chall. Rep., p. 109, pl. 26, fig. 1, text-fig. 18.



a
Text-fig. 5.
Smittina foliaceana
n. sp.
a. mandible.

Reteporellina denticulata Harmer, 1924, Siboga Exped., pp. 581-585, pl. 35, figs. 21-23, pl. 38, figs. 27-32, text-figs. 25 D, 33.

Distribution: Sandwich Is., Loyalty Is., Amboina, Amirante Is., Seychelle Is., Brit. E. Africa, Gaspar Straits, Ceylon, Red Sea, Andaman, Lombok, Sumbawa, Timor, Sulu Arch., Banda Sea, Kei Is., Aru Is., Indian Ocean, Victoria, Japan—Kanagawa-ken, Sizuoka-ken.

Locality: Several colonies were collected at Seto, Siso-zima and near Wakayama.

60. *Iodictyum watanabei* (Okada) 1920

Retepora Watanabei Okada, 1920, Annot. Zool. Jap., vol. 9, pt. 5, p. 618, pl. 8, fig. 5, text-fig. 2.

Distribution: Japan—Osaka-hu, Okayama-ken.

Locality: A complete colony was obtained at Kada.

61. *Triphyllozoon bimunitum* (Ortmann) 1889

Retepora bimunita Ortmann, 1889, Arch. f. Naturg., p. 34, pl. 2, fig. 22.

Triphyllozoon bimunitum Harmer, 1934, Siboga Exped., pp. 616-620, pl. 35, fig. 39, pl. 41, figs. 1-8, 11-14, text-figs. 25 c, 41.

Distribution: Flores, Celebes, Waigeu Id., New Guinea, Kei Is., Philippines, Japan—Kanagawa-ken, Sizuoka-ken.

Locality: A complete colony was obtained at a spot off Wakayama.

62. *Sertella granulata* (Mac Gillivray) 1896

Retepora granulata Mac Gillivray, 1869, Proc. Roy. Soc. Vict., p. 140.

Sertella granulata Harmer, 1934, Siboga Exped., pp. 566-569, pl. 35, fig. 16, pl. 38, figs. 4-6, text-fig. 30.

Distribution: Victoria, Australia, Aru Is., Borneo, Philippines, Torres Straits, Celebes, Sulu Arch.

Locality: A complete colony was obtained at Tonda.

63. *Adeonella japonica* Ortmann 1889

Adeonella japonica Ortmann, 1889, Arch. f. Naturg., p. 54, pl. 4, fig. 11.—Okada, 1920, Annot. Zool. Jap., vol. 9, pt. 5, pp. 8, fig. 9, text-fig. 6.

Distribution: Japan—Kanagawa-ken, Sizuoka-ken.

Locality: Several fragments and colonies were collected at Kata, Seto and off Wakayama.

Family Catenicellidæ Busk 1852

65. *Vittaticella elegans* (Busk) 1852

Catenicella elegans Busk, 1852, Cat. Mar. Poly. Brit. Mus., 1, p. 10, pl. 9.

Distribution: Bass Straits, Algoa Bay, Port Dalrymple, Japan—Mie-ken.

Locality: Several complete colonies were collected at Kada and Wakayama.

Family Celleporidæ Busk 1852

65. *Costazia radiata* (Ortmann) 1889

Cellepora radiata Ortmann, 1889, Arch. f. Naturg., p. 56, pl. 1, fig. 14.

Distribution: Japan—Kyoto-hu, Kanagawa-ken, Straits of Korea.

Locality: Several complete colonies were collected at Kusimoto and Tonda.

66. *Costazia costazii* (Audouin) 1826

Cellepora costazii Audouin, 1826, Expl.

Costazia costazii Okada, 1934, Sc. Rep. T.B.D., sect. B, vol. 2, no. 26, p. 18, pl. 2, fig. 7.

Distribution: Madeira, Bahusia, Bergen, France, Naples, Red Sea, California, Japan—Aomori-ken, Kanagawa-ken, Tiba-ken, Mie-ken, Sizuoka-ken, Straits of Korea.

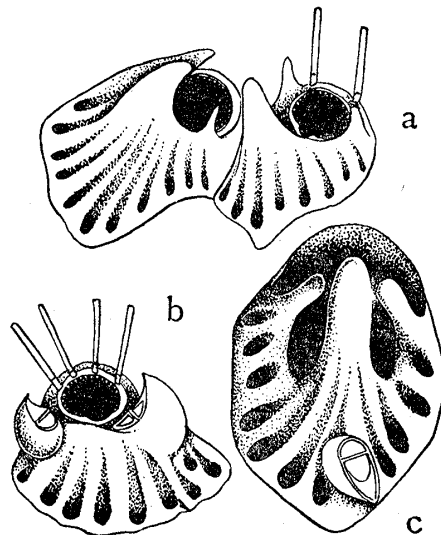
Locality: Several complete colonies were obtained at Kada and Kusimoto.

67. *Cellepora tirostrata* n. sp.

(Text-fig. 6)

Diagnosis: Zoarium incrusting seaweeds, expanded, rather thick. Zoecia arranged somewhat irregularly alternately, distinct, sub-hexagonal, separated by deep furrows. The frontal is distinctly convex, smooth or minutely granulated, and perforated by a few number of large areolar pores. A very large mucronate process at the middle of the lower margin of the aperture, and 2 smaller but distinct processes on each side of the middle one at some distance. One or two small avicularia situated laterally or proximally on the frontal, with triangular mandibles pointing obliquely upwards or downwards. The aperture is circular, and frequently denticulated distally; 2-4 oral spines on its distal margin. Ooecium not observed.

Locality: A complete colony was obtained at Kanayama.



Text-fig. 6. *Cellepora tirostrata* n. sp.

- a. Young zoecia.
- b. Unordinally avicularia.
- c. Old zoecium.

68. *Holoporella tridenticulata* (Busk) 1884

(Pl. 24, fig. 13)

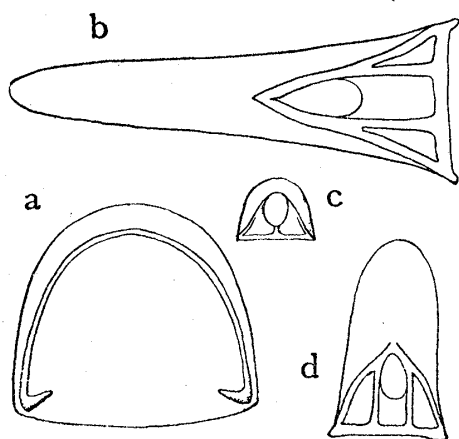
Cellepora tridenticulata Busk, 1884, Chall. Rep., p. 198, pl. 29, fig. 3, pl. 35, fig. 17.

Distribution: Cape York.

Locality: A complete colony was collected at Kusimoto.

69. *Holoporella wakayamensis* n. sp.

(Pl. 24, fig. 14, Text-fig. 7)

Text-fig. 7. *Holoporella wakayamensis*
n. sp.

a. Operculum.

b—d. Three kinds of mandibles.

Diagnosis: Zoarium incrusting, forming a large irregular mass of thick layers of much calcified zooecia. Zooecia multilamellar, irregularly arranged, heaped up one on another. The normal zooecia erect with large, longitudinally elliptical, sometimes sinuated orifice of the deep peristome bearing 2 long spines and hiding the aperture. The aperture with round proximal sinus closed by an operculum; the frontal is smooth, not perforated, convex. The small sub-oral avicularium with semi-circular mandible occurring on the proximal margin of the peristome,

sometimes accompanied by somewhat large avicularium with spatulate mandible. The interzooecial avicularium is very large, with distinct pivot and long, blunt, triangular mandible, scattered among the normal and deep zooecium. Ooecia are globose, not interzooecial, but hyperstomial halfly imbedded in the distal zooecium, with a large aperture.

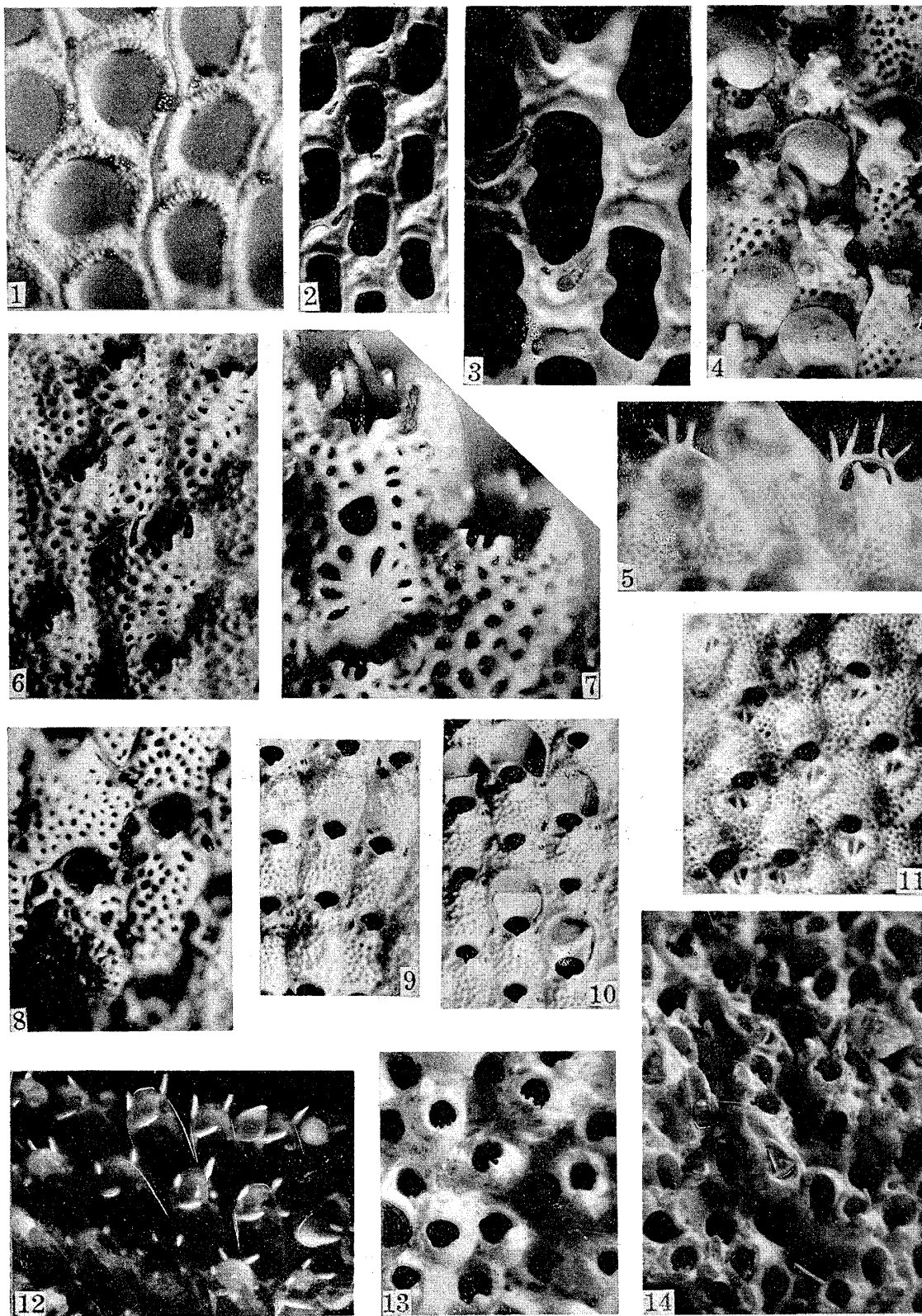
Locality: A complete colony was collected at Kada.

EXPLANATION OF PLATE 24

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|----------|---|---------|
| Fig. 1. | <i>Acanthodesia savartii</i> (Audouin) | p. 448 |
| Fig. 2. | <i>Tegella crenulata</i> (Okada) | p. 449 |
| Fig. 3. | <i>Tegella crenulata</i> (Okada) more enlarged | " |
| Fig. 4. | <i>Petraliella armata</i> n. var. <i>mucroaviculata</i> | p. 454 |
| Fig. 5. | <i>Petraliella armata</i> n. var. <i>mucroaviculata</i> | " |
| Fig. 6. | <i>Smittina foliaceana</i> n. sp. | p. 458 |
| Fig. 7. | <i>Smittina foliaceana</i> n. sp. | " |
| Fig. 8. | <i>Schizopodrella nivea</i> (Busk) | p. 456 |
| Fig. 9. | <i>Schizopodrella nivea</i> (Busk) | " |
| Fig. 10. | <i>Schizopodrella nivea</i> (Busk) | " |
| Fig. 11. | <i>Microporella ciliata</i> (Pallas) | p. 457 |
| Fig. 12. | <i>Beania hexaceras</i> (Ortmann) | p. 453 |
| Fig. 13. | <i>Holoporella tridenticulata</i> (Busk) | p. 462 |
| Fig. 14. | <i>Holoporella wakayamensis</i> n. sp. | p. 472. |

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PLATE 24



OKADA and MAWATARI: BRYOZOA OF WAKAYAMA-KEN